

REMARKS

Applicant would like to thank Examiner Nadav for the telephonic interview on January 26, 2005. The interview focused on the rejection of claim 15 under 35 U.S.C. § 103. During this interview, Applicant's representatives, Benjamin S. Withrow (Reg. No. 40,876) and R. Chad Bevins (Reg. No. 51,468), agreed to amend the independent claims in order to more clearly claim the present invention.

§ 103

The Patent Office rejected claims 15-23 and 26-33 under 35 U.S.C. § 103(a) as being unpatentable over Ogawa (U.S. Patent No. 6,750,158) in view of Yonehara (U.S. Patent No. 6,656,271) or Miyabayashi (U.S. Patent No. 6,660,606). In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. According to MPEP 2143.03, "[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art."

Regarding claim 15, the combination of Ogawa and Yonehara or Miyabayashi fails to teach or suggest at least depositing a sacrificial epitaxial layer on a substrate and oxidizing the sacrificial layer to separate the substrate from one or more structural epitaxial layers, wherein oxidizing the sacrificial epitaxial layer alters the chemical composition of the sacrificial epitaxial layer such that an ability of the sacrificial layer to adhere the substrate to the one or more epitaxial layers is substantially reduced. As illustrated in Figures 1A-1E, Ogawa discloses a GaN buffer layer (not shown) and an n-type contact layer 12 sequentially grown on a substrate (11) (see column 3, lines 60-65). As stated in column 4, lines 22:

As shown in FIG. 1B, after the epitaxial substrate is taken out of the reaction chamber of the MOVPE apparatus, the mother substrate 11 is irradiated with laser light 80 from the surface opposite to the n-type contact layer 12, so that a thermally decomposed layer 12a obtained by thermally decomposing the n-type contact layer 12 is formed at the interface of the n-type contact layer 12 with the mother substrate 11.

Thus, the thermally decomposed layer (12a) is a thermally decomposed portion of the contact layer (12) formed by irradiating a surface of the contact layer (12) by laser light (80) through the substrate (11), as illustrated in Figure 1B. After forming the thermally decomposed layer (12a), epitaxial layers (13-16) are grown. (See column 4, line 53 – column 5, line 4). As discussed in column 5, lines 18-20, the contact layer (12) is separated from the substrate (11) by using hydrochloric acid to remove the thermally decomposed layer (12a).

In rejecting claim 15, the Patent Office stated that column 3, lines 60-61 discloses depositing a sacrificial epitaxial layer on a substrate. Column 3, lines 60-61 discloses "a buffer layer (not shown) made of gallium nitride (GaN)." Thus, the Patent Office had indicated that the buffer layer (not shown) of Ogawa is a sacrificial layer. However, the buffer layer (not shown) of Ogawa is not oxidized to separate the contact layer (12) from the substrate (11). Further, the chemical composition of the buffer layer (not shown) is not altered by oxidation to substantially reduce the ability of the buffer layer to adhere the substrate (11) to the contact layer (12). Rather, as discussed above, Ogawa discloses that a portion of the contact layer (12) is thermally decomposed using laser light (80) to form a thermally decomposed layer (12a) of the contact layer (12). This thermally decomposed layer (12a), rather than the buffer layer (not shown), is removed by hydrochloric acid to separate the contact layer (12) from the substrate (11). Thus, the buffer layer (not shown) of Ogawa is not a sacrificial layer that is oxidized to separate the substrate from one or more structural epitaxial layers, wherein oxidizing the sacrificial epitaxial layer alters the chemical composition of the sacrificial epitaxial layer such that an ability of the sacrificial layer to adhere the substrate to the one or more epitaxial layers is substantially reduced.

As for the thermally decomposed layer (12a), it too is not a sacrificial layer deposited on a substrate and oxidized to separate the substrate from one or more epitaxial layers, as claimed. Rather, the thermally decomposed layer (12a) is a thermally decomposed portion of the contact layer (12) that is formed after the contact layer (12) is deposited on the substrate (11) by irradiating a surface of the contact layer (12) by directing laser light (80) through the substrate (11). Thus, Ogawa fails to teach or suggest a sacrificial layer deposited on a substrate that is oxidized to separate the substrate from one or more structural epitaxial layers, wherein oxidizing the sacrificial epitaxial layer alters the chemical composition of the sacrificial epitaxial layer such that an ability of the sacrificial layer to adhere the substrate to the one or more epitaxial layers is substantially reduced.

Further, even when Ogawa is combined with either Yonehara or Miyabayashi, this deficiency is not cured. The Patent Office has indicated that Yonehara or Miyabayashi are used to merely to show oxidation of an epitaxial layer. However, there is no teaching or suggestion on either Yonehara or Miyabayashi or in Ogawa to oxidize the buffer layer (not shown) disclosed by Ogawa.

Thus, the combination of Ogawa, Yonehara, and Miyabayashi fails to teach or suggest depositing a sacrificial layer on a substrate and oxidizing the sacrificial layer to separate the substrate from one or more structural epitaxial layers deposited on the sacrificial layer, wherein oxidizing the sacrificial epitaxial layer alters the chemical composition of the sacrificial epitaxial layer such that an ability of the sacrificial layer to adhere the substrate to the one or more epitaxial layers is substantially reduced. Accordingly, claim 15 is allowable.

For at least the same reasons claim 15 is allowable, claims 16-35 are also allowable. However, Applicant reserves the right to further address the rejections of claims 16-35 in the future if necessary.

New Claims 36-41

Applicant has added new claims 36-41. Support for these claims can be found in paragraph [0022] on pages 4 and 5 of Applicant's original specification. Accordingly, no new matter has been added. For at least the same reasons, claim 15 is allowable, claims 36-41 are also allowable. In addition, the references cited by the Patent Office fail to teach or suggest an aluminum rich sacrificial layer, an aluminum rich sacrificial layer having an aluminum mole fraction of 0.3, or an aluminum gallium nitride sacrificial layer. As such, claims 36-41 are allowable.

Conclusion

In view of the discussion above, claims 15-41 are allowable. Reconsideration is respectfully requested. If any issues remain, the examiner is encouraged to contact the undersigned attorney of record to expedite allowance and issue.

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Respectfully submitted,
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